

statistics makes clear that this is an unrealized potential in this instance.

It is obvious that many cancer patients and families of patients will require more extensive, direct forms of service from mental health professionals than can be afforded by telephone counseling. Nonetheless, it is a fact that only a small percentage of cancer patients, or patients' family members, will receive services from a mental health professional (17). Surveying oncology settings as a whole, one could safely claim that, from a psychosocial perspective, cancer patients in general are underserved. A large majority of cancer patients are treated in community hospitals and oncology practices away from comprehensive cancer centers. Most smaller hospitals, and certainly many outpatient settings, do not have psychiatric or social services available. Even within a large comprehensive center such as UCLA, which has a large psychiatry department and an active consultation liaison service, there are never sufficient personnel to see all patients.

It must be remembered, at the same time, that not every expression of intense affect, nor every emotional crisis in the course of chronic illness, nor every manifestation of temporary difficulty in coping requires referral to a mental health professional. Many of these people could benefit from an empathic listener who would help assess the problem, clarify and focus concerns, provide relevant information, and perhaps offer specific suggestions or other brief interventions that might be helpful. It is this type of aid that a telephone counseling line can provide.

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Unreported Dog Bites in Children

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Synopsis

In 1981, more than 3,200 Pennsylvania children, ages 4 to 18 years, were surveyed about their dog bite histories and attitudes toward animals. Dog bites were much more common than previously reported: 45 percent of children had been bitten dur-

ing their lifetimes, and 15.5 percent had been bitten in 1980, more than 36 times the rate reported to health authorities.

In 1980, the highest bite rate occurred among children 7–12 years old (20 percent). Children were bitten more frequently by the dogs owned by their neighbors, followed by their own dogs, than by strays or by dogs whose owners were not known. Boys were bitten twice as frequently as girls by

neighbors' dogs and strays; the bite rates from family dogs were identical in boys and girls.

Despite the high bite rates, being bitten was not significantly associated, in most groups of children studied, with a dislike of dogs. These positive attitudes toward dogs may lead to inadequate precautions against bites and to biases in the reporting of bites to health authorities.

IN ESTIMATING RATES OF DOG BITES, researchers and public health officials have had to rely primarily upon bites reported to health authorities. Reported rates influence public health and public policies in such matters as leash laws, the impounding of strays, the amount of money spent on animal control, and rabies vaccination programs for both pets and people.

The management of rabies is an example of how reporting directly influences public policy. New York and Philadelphia drastically curtailed the number of dog bite victims who received rabies post-exposure prophylaxis, after analyzing their reported animal bite rates, and declared themselves rabies free (1–3). These changes, based on data reported to health departments, not only spared many bite victims the trauma of unnecessary rabies prophylaxis but saved a great deal of public money (4).

Because dogs account for the vast majority of all animal bites, they have been the most studied, and many epidemiologic reviews of dog bites exist (5–16). All of these studies identify children under age 18 as the most frequent victims, but all these studies rely only on official reports of bites as the data base. Studies of fatal dog bites rely more on newspaper articles than on official health reports, in part because official reporting inadequately identifies the true frequency of occurrence (17–19).

The present study will not duplicate the literature by discussing the general epidemiologic patterns of animal bites, such as time, manner, and place, but will focus on the discrepancies between the reported and unreported public health event. Our study demonstrates that previous studies relying on reported bites markedly underestimate the frequency of dog bites in the population among children. This is a serious problem, considering the importance of reported bite data in forming public policy and their representation in the public health literature.

The reported bite rate for the general population is 450 to 737 per 100,000 annually, but children from the ages of 5 to 9 suffer a much higher reported rate of 1,700 per 100,000 (5,11). We believe these figures greatly underestimate the true nature of the problem.

Though health officials recognize that reported bites are only the proverbial "tip of an iceberg," they generally estimate the unreported rate to be about double that of the reported one. Unfortunately, no studies of the rate of unreported bites have been undertaken. The "doubling syndrome" is a common practice because the actual bite rate is unknown. This practice tends to minimize the problem because it assumes that as many as 50 percent of the bites are indeed reported. However, we know that not all bites are seen by physicians and not all bites treated by physicians or even in emergency rooms are reported to public health officials; in New York in 1976, only 41 percent of bites treated in emergency rooms were reported (20). On Air Force bases, where free medical care and closer supervision of the health care delivery system encourage better reporting, the reported bite rate is more than three times the reported rate for the civilian population, despite the fact that the dogs on the bases are better supervised (10).

The present study provides a more accurate estimate of the actual number of dog bites in a representative population of children.

Methods

The information was collected as part of a questionnaire survey in early 1981 on children's animal interests. The survey area included rural and small town schools in a county near a large urban center in Pennsylvania (highest population density: 5,783 persons per square mile). A total of 3,256 preschool to 12th grade students, in 28 schools, were surveyed (1,525 boys and 1,713 girls, with incomplete data on

18 students). The schools were self-selected, first by district superintendents (8 of 13 districts chose to participate), then by principals (24 public schools of 62). Out of the 8-district student population of 38,667, we surveyed 2,871 students. Four private schools (all parochial) of the 59 private schools in the county chose to participate, and 385 private school students of a total private school population of 9,288 were surveyed; thus private school students were underrepresented.

Surveying was done by entire classrooms, yielding 10 to 100 percent of the grade enrollment in each school. Personal interviews were conducted by B. A. J. with children through the first grade (only one child chose not to respond). None of the interviewed students showed reluctance to discuss their animal bites. The rest of the students were given questionnaires by teachers or principals in homerooms, though studyhalls were occasionally used. Answers about liking for and dislike of animals were elicited first, along with pet ownership and other information. Questions about dog bites were last.

In sum, there seems to have been little nonreporting or self-selection by the student respondents in the study. The area and schools were not chosen because of a perceived bite problem. Other aspects of the study were stressed with superintendents and principals, since these aspects, such as attitudes about animals, were the initial focus of the study. There was no indication that the population surveyed has a different risk of dog bite than other populations in similar environments. One small town had a stray dog problem at the time, and the students from the elementary school in the center of the town had the highest stray dog bite rate (14.1 percent). The students from adjacent rural elementary schools had a bite rate from strays of only 5.8 percent.

For the interviewed students, the researcher recorded only those bites from dogs perceived to be aggressive, not bites received in play. The teachers were given a statement to read to their students indicating the same guidelines, though it is not known whether they actually read it in every case. Since health officials consider a "bite" as any break in the skin caused by an animal's teeth, regardless of the intention, the true bite rate for younger students was higher than indicated, as bites received during play were not considered. The researchers were, however, primarily concerned with the problem of perceived aggression in dogs leading to bites. The interviewed students readily distinguished between the two kinds of bites. In any case, the prob-

lem would lead to an underreporting, not overreporting, of bite incidents.

No information was collected on severity of bite, length of hospital stays, or emergency room versus physician office visits. The researchers wanted to keep the questionnaire as short as possible and not dwell on the bite issue so as to encourage cooperation. One principal refused participation because she felt the bite questions would increase anxiety. Such anxiety was never observed during the study.

The children were also asked to list their most and least favorite animals and their choices were compared with whether or not they were bitten.

Because being bitten is a discrete event and the population samples were all large, chi-square and parametric analytical methods (*z* scores) were utilized to assess statistical inferences. Both approaches yielded similar results.

Results

A total of 46.1 percent of all the students (1,494 of 3,238) reported being bitten by a dog during their lifetime: 54.5 percent of all boys (831 of 1,525) and 38.6 percent of all girls (662 of 1,713). This difference is statistically significant ($P < 0.001$). More than 15 percent of the children reported being bitten in 1980 alone; 19.2 percent of boys and 12.2 percent of girls reported bites. The county's overall reported rate for 1980 bites for the age group 5 to 14 years was 0.47 percent; for boys alone, 0.6 percent; and for girls alone, 0.3 percent. The survey identified a significantly greater number of bites.

Risk factors. The main predisposing factors in dog bite were found to be age and sex of the victim and whether the dog was owned and by whom.

Sex. The higher proportion of boys over girls bitten both during their lifetimes and during 1980 is significant ($P < 0.001$). There were also significant differences between boys and girls at different ages (table 1). Boys are at greatest risk between the ages of 6 and 14, girls between 6 and 11. Statistically significant differences between girls and boys occurred only at the following age levels: between 9 and 11 and between 12 and 14 ($P < 0.001$).

Ownership. The nature of ownership of the dogs inflicting bites significantly influenced bite frequency (table 2). For example, children received bites from neighbors' dogs significantly more often than from strays ($P < 0.05$). Boys were bitten significantly more often than girls by neighbors' dogs

Table 1. Percent of population of each age level bitten in 1980 (age-specific bite rates)

Age (years)	Total (N = 3,238)		Boys (N = 1,525)		Girls (N = 1,713)	
	Number	Percent	Number	Percent	Number	Percent
3-5	37	9.0	16	8.2	21	9.8
6-8	160	20.7	83	23.8	77	18.8
9-11	183	20.0	113	26.8	70	14.4
12-14	96	14.7	68	21.7	28	8.4
15-17	27	5.6	17	6.9	10	4.2
Average	503	15.5	297	19.5	206	12.0

Table 2. Ownership patterns of biting dogs

Ownership	Total		Boys		Girls	
	Number	Percent	Number	Percent	Number	Percent
Neighbor	761	23.4	446	28.6	316	18.6
Family owned ..	461	14.2	220	14.1	241	14.3
Stray or owner unknown ...	310	9.5	202	15.6	107	6.3
Total ...	1,532		868		664	

Table 3. Ownership patterns of biting dogs leading to medical attention

Ownership	Total bitten	Taken to physician	
		Number	Percent
Stray or owner unknown ...	310	156	50.3
Neighbor	761	300	39.4
Family	461	134	29.1
Total	1,532	590	39.0

and strays ($P < 0.001$), though girls and boys were bitten with similar frequency by family dogs. We found that children who owned dogs at the time of the survey (early 1981) were also more likely to have been bitten in 1980 ($P < 0.001$). It is probable that owners tend to be less cautious than nonowners with dogs they encounter.

Perceptual factors. Since people vary in their perceptions of the seriousness of dog bites, it is extremely difficult to separate these perceptions from the actual severity. Being taken to a physician is one indication of perceived seriousness. Of the total study population, 17 percent reported having received medical attention for dog bites in their

lifetime: 21.1 percent of boys and 14 percent of girls. The only factor which was of significance in precipitating visits to physicians was the ownership category of the dog doing the biting: 50.3 percent of bites from strays (or unknown owner) were seen by physicians, but only 39.4 percent of the bites from dogs owned by neighbors and 29.1 percent of the bites from the family's own dog ($P < 0.001$, table 3). The sex of the victim was not a significant factor, and there were insufficient data to analyze age as a factor.

Bites and attitudes. The questionnaire asked children to choose their favorite and least favorite animals. In general, girls favored cats and horses significantly more often than did boys. Boys tended to favor dogs ($P < 0.001$). There were few statistically significant differences between children bitten by dogs and those not bitten with respect to their choice of a favorite or least favorite animal, which is in itself worthy of study.

Despite the high bite rate and the rather large proportion of children taken to physicians for bites, three categories of children did not differ significantly in their choice of dogs as favorite animals: 30.4 percent of those bitten in their lifetime (boys and girls combined) chose the dog as favorite, 30.1 percent of those bitten in 1980, and 30.5 percent of those never bitten. The dislike for dogs was only slightly higher (but not significantly) in those bitten in their lifetime (4.5 percent chose the dog as the animal most disliked, compared with 3.9 percent of those never bitten).

However, when girls and boys were compared, using the same groupings (those bitten, those bitten in 1980, and those never bitten), only one pair showed significant differences in their choice of dogs as favorites: girls bitten in 1980 and girls never bitten ($P < 0.05$). Those girls bitten in 1980 chose the dog less often as favorite. Boys showed no significant differences among the three groups.

The ownership of the dog inflicting the bite (family, neighbor, or stray) had no influence on the liking for dogs among boys or girls, nor did going to a physician for a dog bite influence attitudes. However, boys tended to like dogs slightly more (but not significantly) after having been bitten by the family dog or being taken to a physician.

Discussion

It must be understood that we surveyed remembered bites, not all bites. Perceptual and recall factors are problems in any health survey. The 45

percent overall bite frequency must be taken as an underestimate, since the cumulative frequency did not increase with age and sometimes decreased, and "play" bites are underreported.

It is not possible at this time to state whether this reflects a recent increase in bites or a recall problem. Nevertheless, we conclude that being bitten by a dog is a rather common occurrence for children, especially those between the ages of 7 and 12 years, and the event is greatly underestimated by official bite statistics.

The county's official 1980 bite rate for children 5-14 was 0.47 percent—0.6 percent for boys and 0.3 percent for girls. The survey found bite rates of 17.3 percent for the total population, 21.8 percent for boys and 13.6 percent for girls during this period for the age group 3 to 14 years, and slightly higher rates for the age groups 6 to 14 years (table 1). The reported rates underestimated the overall frequency by nearly 37-fold and by nearly 48-fold for girls ages 6 to 14.

No attempt was made to ascertain the severity of the bite (other than going to a physician) or costs of treatment; however, other studies have found that about 10 percent of bites require suturing and the average medical cost for a dog bite is \$38.50, although associated expenses bring the cost to the victim to about \$49 (21).

Although a dog bite is not necessarily traumatic for the victim, the high frequency should encourage vigilance among dog owners and those concerned about the welfare of children.

The reporting of dog bites to public health authorities depends largely upon the subjective assessment of risk to the victim, popular assumptions about tendencies of certain dogs to bite, and other intangible psychological and cultural factors, rather than on the simple fact that bites are supposed to be reported.

Bites from stray dogs account for only 9.5 percent of our sample. In studies on military bases where reporting is much better than for the general population, researchers found that only 9.8 percent of the bites were by strays (10); however, the reported bite rate from stray dogs in civilian populations is 20 percent (4,14).

There are a number of possible explanations for the low frequency of bites from stray dogs in this study and their perceived high frequency in other studies that rely on reported bites. In this study, bites from unowned dogs were differentially reported because people bitten by them were more often taken for medical treatment than those bitten by dogs whose owners were known to the victim.

This is probably a common pattern. In addition, we know that medical personnel do not report to health authorities all bites treated (20), and it may be that bites from strays are differentially reported by the physicians.

The overreporting of bites from strays relative to owned dogs has probably been influenced by the belief that strays are less likely to have been immunized against rabies. In fact, in the United States, over the years, 87 percent of rabid dogs (22) and nearly half of the rabid cats (23) have been owned animals. The recent increase of rabies in raccoons (24) may very well increase the incidence of rabies in pets, and it is imperative that we appreciate the actual frequency of bites from owned dogs.

Stray dogs may also be seen as a continuing danger in the environment compared with owned dogs, which can be identified and restrained after a bite. However, free-roaming pet dogs in New York were found to act more aggressively toward people than unowned dogs, which generally avoided people (25).

Lastly, stray dogs generally are encountered less than owned dogs, and about half of all bites are from dogs owned by neighbors.

The fact that boys are bitten significantly more by strays and by dogs owned by neighbors may mean boys spend more time outside, compared with girls, or girls may avoid strange dogs more than boys. Within the family, boys and girls are bitten with the same frequency.

The fact that dog owners experience a greater bite rate should not be surprising since they not only have more contact with dogs, but they also may be less likely to avoid other people's animals. A study of letter carriers indicated that those carriers who owned dogs were more likely to be bitten while working than those carriers who did not own dogs (12).

Children appear to accept being bitten by dogs much as they do other accidents such as falling off a bike. Being bitten had little influence on the liking for dogs.

The general absence of correlation between being bitten and liking for dogs has implications for both the epidemiology of bites and the development of phobias. Our findings reinforce those of other researchers who recognize that phobias in children usually have no relation to negative experiences with the feared object (26). Hagman (27) noted that phobias about dogs usually have their origins in a mother's phobias.

This study identifies the important concern that

children may simply accept bites too readily out of affection for the animal or a belief that bites are inevitable. Voith (28), who counsels people with aggressive dogs, cautions that children often do not change their behavior toward dangerous animals, even if they have been bitten severely. Dogs that have killed people have always been owned, often by the victim's family (17-19).

Conclusion

We must change our perceptions of pet dogs to include the image of a potential biter: not all dogs are "Lassie" or fit the myth she conjures for us. Fortunately, many bites could have been prevented: owners can stop allowing their dogs to roam, children-dog interactions can be better supervised, and parents, children, and dog owners can become more aware of the natural tendency of pets to bite.

Teachers and school nurses are in an excellent position to assess the dog problems in their areas and bring them to the attention of parents and health officials. They can also educate students to recognize what situations may precipitate bites and what clues a dog gives to signal a potential bite.

The epidemiology of disease and injury leads to public policy (29), and this is true for the epidemiology of dog bite injury as well. It is time to utilize epidemiologic methods to evaluate and understand injury as well as disease (30).

It is apparent from this study that we cannot rely on the accurate "reporting" of bites by health authorities as our sole source of epidemiologic information. Usual reporting mechanisms significantly underestimate the frequency of bites and fail to identify the role of certain segments of the animal population like the owned dog. This distortion of the true epidemiologic picture leads to misconceptions.

Misconceptions about dogs influence how people supervise and interact with them and, too often, ignorance leads to injury. If dogs are properly supervised and people interact more knowledgeably with them, dogs' actual behavior may indeed approximate the more benign expectations we now hold of them. By decreasing the overall bite rate, the incidence of serious injury to children will also decrease, and children can continue to benefit from the many values of animal companionship (31).

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Use of Vitamin-Mineral Supplements by AFDC Children

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Synopsis

Slightly more than 11 percent of the 1,616 children in Northern Mississippi households receiving Aid to Families with Dependent Children regularly used vitamins, according to the 540 personal interviews conducted in this study. Of the vitamins used,

about 20 percent were obtained by prescription. Participation in Early and Periodic Screening, Diagnosis and Treatment (EPSDT) was found not to be related to vitamin use.

The pharmacy was the main source of vitamins, which most frequently were those widely advertised on television. It is suggested that pharmacists, physicians, and EPSDT personnel might take a more active role in nutrition counseling.

The population is poor by definition and rural by study design. In the face of these facts, it was interesting to find that the most often used vitamin was Flintstones, one of the more expensive brands of children's vitamins. Some other vitamin products used, in descending order of frequency were One-A-Day vitamins, generic prenatal vitamins, and Neo-Vadrin with Iron. Data on shopping behavior and sources of products indicate that the population may not be making the best use of products or funds. Informal counseling by pharmacists at the point of sale has the potential to reduce these problems.

THE 1981 RELEASE by the U.S. Department of Health and Human Services of the four-volume report "Better Health for our Children: A National Strategy" (1) gave researchers, planners, and providers a wealth of information on which to judge the current status of child health and to chart a course for the future. Many pages of the Select Panel's report focus on nutrition, but we could find little recognition of the role or consumption of vitamins, even though millions of dollars are spent annually on such products.

Data were presented on nutrient intakes below 1980 recommended dietary allowances; average intake was expressed as a percentage of 1980 RDA, spring 1977 (1a). Deficiencies among those under 18 years of age are shown in table 1.

More relevant and better documented are the data from a study by Koh and Caples on nutrient

intake of low-income, black families in southwestern Mississippi (2a). Using the 24-hour dietary recall method for 7 consecutive days, they found nutrient intakes approaching or above recommended

Table 1. Nutrient intake below recommended dietary allowances for Americans under 18

Nutrient deficiency	Age groups
Males and females:	
Calcium	3-5; 9-18
Iron	1-5; 12-18
Magnesium	3-18
Vitamin B6	3-18
Females only:	
Iron	9-11
Phosphorus	12-18

SOURCE: Reference 1a.